Conclusions

In today's health care environment, decisions about medical interventions need to reflect measures of cost as well as clinical benefit. While it is clear that PTCA is significantly more expensive than medical therapy alone, analyses incorporating quality of life considerations suggest that angioplasty techniques that have been shown to improve clinical outcomes are, for the most part, cost-effective. For example, by reducing symptoms at a modest cost, balloon angioplasty appears to be reasonably cost-effective compared with medical treatment for patients with moderate to severe angina and single vessel coronary disease. Similarly, coronary stenting increases costs for most patients but is associated with improved outcomes compared with conventional PTCA. Formal cost-effectiveness analysis also suggests that these benefits are worth the cost, at least for patients with discrete stenoses that can be treated with a single stent. On the other hand, most other new devices—including rotational ablation, directional atherectomy, and excimer laser angioplasty—have not been shown to improve clinical outcome compared with balloon angioplasty. Given the higher procedural and hospital costs associated with these devices, it remains difficult to justify their use at present, except for specific lesion subsets for which angioplasty or stenting are unlikely to be successful or in the setting of ongoing clinical investigation.

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Is a US analysis of cost-effectiveness in interventional cardiology relevant to a centrally funded health care system?

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Early studies of costs from the United States were simple comparisons of hospital charges—for example, between coronary bypass and coronary angioplasty.[1 2] This generous approach seemed far removed from our centrally funded system in the UK, and we tended to look jealously across the water where costs could be transferred to willing payers on an individual patient basis. Not so now; first, Cohen and Sukin[3] have done much to clarify the costs, detailing each item of resource consumption and possible cost-

effectiveness of the devices and activities in interventional cardiology. Second, the health care systems have changed in both countries.

Although we are still relatively low cost, over-regulated and underprovided compared with the United States,[4] both countries now have a market system of sorts. In both systems major purchasing groups of varying kinds act on behalf of groups of potential patients and agree on terms with providers, entering into contracts, often on an annual basis, for block delivery of health care. In the case of interventional cardiology, this will be to a large extent procedurally based, such as stipulated numbers of coronary angiographies and angioplasties to be done in a given period. Herein lies one of our problems: this bean counting approach is not conducive to encouraging developments that make the initial procedure more expensive but which may eventually be cost-effective. Prime examples are stenting, which is known to reduce the need for repeat revascularisation in selected patients, and abciximab (ReoPro; Lilly, Basingstoke, UK), which reduces complications; both involve a high procedural hospital cost.

Cohen and Sukin's model should help us better to justify these high initial costs. While calculations and actual costs may differ between countries, the basic principles are the same.

The acceptable cost-effectiveness ratio[3 5]—the incremental cost of a given procedure for a given health benefit measured by agreed criteria (such as quality adjusted life years (QALY) gained) compared with other medical interventions, which is acceptable to the community—is a matter of health policy. Cost-utility analysis is, as discussed by Robinson,[6] still at an early developmental stage. Calculations are complex and decision makers, as well as exercising "the appropriate caution, care and intelligence"[6] will have to be light on their feet. For example, Cohen and Sukin's calculations of stenting are based on trial evidence in a rapidly changing field; results from stenting are continually improving in terms of angiographic lumen gained and maintained, and the hospital costs are falling, partly because of the acceptance of antiplatelet therapy rather than anticoagulation (supported now by trial evidence[7]), and partly as a result of competition between the stent makers. On the other hand the stent trials have involved very selected patients and lesions, and to extrapolate the (relatively modest) benefits of stenting in terms of restenosis and requirement for target vessel revascularisation to other lesions and patient subsets would be inappropriate. This is particularly so in view of improving results being obtained by balloon angioplasty with "stent standby".

Cost, like some other things in life, is not everything; from Cohen and Sukin's calculations, by far the greatest potential cost benefit of stenting is in the reduction of restenosis, but clinically the most appealing facet of stents maybe the reduction in risk, and consequences, of a complication.

Some purchasers (such as health authorities) are already considering buying coronary revascularisation for a certain number of patients, rather than procedures, on an annual basis. This is a step in the right direction, but it would of course be preferable if not only the hospital cost but also the cost to society as a whole of adopting (or failing to adopt) a new procedure could be calculated and set against the measured health gain. Changes in purchasing arrangements, for example general practitioner consortia, could, by considering at least the medical component of out-of-hospital costs, represent light at the end of the tunnel in this respect.

Evidence based medicine and cost-utility analysis are part of a new jargon, but they are not new concepts. In the UK at any rate, doctors have been responsible for rationing health care at the point of delivery for many years. New methods have been taken up or discarded, not regardless of cost and based just on a hunch, but depending partly on relative expense and partly on perceived utility based on experience. The latter is potentially more accurate in practice than a rigid approach to evidence from randomised clinical trials, which do after all have significant limitations.

The best approach is a flexible one, cooperating with the health economists and policy makers in improving our information systems, making the assessment of cost-effectiveness more sophisticated, and incorporating such analysis prospectively in our clinical trials, while at the same time acknowledging that clinical medicine cannot be simplistically reduced to bean counting. As recently argued in discussing the relation between contracts and clinical care for chronic ailments (of which coronary disease is an example), there should be "renewed emphasis on trust and mutual respect".[8]

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